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Conceptual paper

The effect of organizational structure on absorptive capacity in single and dual learning modes☆

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ABSTRACT

Structural theories of absorptive capacity (ACAP) usually aim to specify organizational design characteristics that lead to a high level of ACAP. Drawing on the theories of organizational design and knowledge management, this paper reviews how organizational structure relates to ACAP in single and dual learning modes. This study analyzed the structure of the ACAP relationship in management and organization studies based on a literature review of ACAP research. This study contributes to the ACAP literature in five ways: (1) it investigates the role of ACAP as an independent variable; (2) it focuses on the behavioral domain of ACAP; (3) it relates structural variables to ACAP in single and dual learning modes; (4) it establishes a link between structural variables and ACAP using a two-stage model, comprising initiation and implementation stages; and (5) it predicts ACAP by identifying several testable propositions and deriving two predictive contingency models. Several propositions and two predictive contingency models are recommended as directions for future research and theory construction.

Introduction

During the past two decades, researchers have proposed a number of models and frameworks with which to analyze absorptive capacity (ACAP). The interest in ACAP has grown significantly over the past three decades, and continues to do so today (Apriliyanti & Alon, 2017; Gao, Yeoh, Wong, & Scheepers, 2017). Unfortunately, few studies capture the richness and multidimensional nature of ACAP (Jansen, Van den Bosch, & Volberda, 2005a), although several recent works have examined the multidimensionality of ACAP (Apriliyanti & Alon, 2017; Gao et al., 2017; Martinkenaite & Breunig, 2016).

A recent review of the literature on ACAP by Gao et al. (2017) shows that ACAP is typically represented in the literature as either a dependent or an independent variable or as a mediator. Very few studies consider ACAP as an independent variable, or as mediating or moderating variables. Thus, researchers have largely ignored the organizational antecedents of ACAP, focusing instead on the outcomes of ACAP. Gao et al. (2017) find that researchers are more interested in investigating the influence of ACAP on organizational phenomena than in examining the effect of organizational phenomena on organizational ACAP. Conventionally, ACAP is perceived as the outcome of an investment in research and development, although recently, debates over its proactive dimension have begun to emerge (De Araújo Burcharth, Lettl, & Ulhøi, 2015; Gao et al., 2017).

It is important that we investigate ACAP as being dependent, independent, a mediator, or a moderator, because, as argued by Cepeda-Carrion, Leal-Millán, Martelo-Landroguez, and Leal-Rodriguez (2016), the multidimensionality of ACAP is essentially a distinct concept and, consequently, may draw on different structures, objectives, and strategies. One the other hand, Jansen et al. (2005a) argue that organizational antecedents may have differing effects on the dimensions of ACAP and, thus, may lead to different performance outcomes.

Until the work of Cohen and Levinthal (1990), research had focused on technical aspect of organizations, or intellectual property (e.g., copyrights, patents, trade secrets, proprietary rights, and R&D expenditure), as the key determinants of ACAP. Then, Zahra and George (2002) began a new debate, focusing on the

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non-technical aspect of organizations, such as organizational capabilities and managerial practices, as the key drivers of ACAP (Ali & Park, 2016). Recently, Gao et al. (2017) categorized the domain of ACAP literature into technical and behavior aspects, and concluded that 44 of 65 studies focus on the technical domain.

Zahra and George (2002) classify ACAP along four dimensions, which they combine into two subsets: knowledge acquisition and assimilation (potential ACAP, or PACAP), and knowledge transformation and exploitation (realized ACAP, or RACAP). The diverse, richness and multidimensionality of ACAP suggest that, within an organization, it is a dynamic, complex, multi-phased activity that moves, from PACAP to RACAP. Different organizational designs, configurations, and attitudes of strategic decision-makers result in variations in the development of ACAP. The successful completion of each stage seems to call for a different organizational structure.

This study relates knowledge to innovation, because the organizational characteristics that promote adaptive innovation also promote learning (Ali & Park, 2016). This rationale is supported by Lundvall (2006), who advises that there is no clear distinction between innovation and knowledge, while Nataraajan (2016) debates whether innovation leads to knowledge, or vice versa. Therefore, structural variables may influence innovation, but may also influence knowledge. Here, knowledge reflects the concept of ACAP.

Structural theories of ACAP usually aim to specify organizational design characteristics that lead to a high level of performance of ACAP. In response to these issues, the aim of this study is to examine the literature in order to analyze the relationship between structural variables and ACAP, in single and dual modes. Specifically, this study offers the following contributions.

First, it deals with the antecedent of ACAP (i.e., organizational structure). This study examines the traditional variables that define a firm's organizational structure as antecedents of ACAP, which help firms to develop, transfer, and use knowledge. Similarly, we investigate the relationship between various structural variables and ACAP (De Araújo, 2010; Jansen, Van Den Bosch, & Volberda, 2006).

Second, we link the structural variables and ACAP using a two-stage model, comprising an *initiation stage* and an *implementation stage* (Damanpour & Gopalakrishnan, 1998; Kim, 1980; Pierce & Delbecq, 1977; Zaltman, Duncan, & Holbeck, 1973). There is a growing consensus that high complexity, low formalization, low centralization, and high integration facilitate the initiation stage. However, low complexity, high formalization, high centralization, and high integration facilitate the implementation stage (Damanpour & Gopalakrishnan, 1998; Damanpour, 1996; Kim, 1976).

Finally, we analyze how the characteristics of organizational structure (complexity, formalization, centralization, and integration) influence ACAP in a single-learning innovative-mode organization (hereafter, single mode) and in a dual-learning innovation-mode organization (hereafter, dual mode). In the single-mode case, organizations maintain the same structure pattern while ACAP takes place, and have no clear division of work for the dimensions of ACAP. However, in the dual-mode case, we use PACAP to reflect the initiation stage, and RACAP to reflect the implementation stage.

Section 'Theoretical consideration' presents the theoretical framework. Section 'Proposed framework' presents the details of the proposed framework. The theoretical contributions are discussed in Section 'Theoretical contributions', and general conclusions appear in Section 'Conclusions, limitations and recommendations'.

Theoretical consideration

ACAP

Kedia and Bhagat (1988) first coined the term absorptive capacity (ACAP), which then since received considerable attention after the work of Cohen and Levinthal (1990). Cohen and Levinthal define ACAP as a firm's ability to recognize the value of new external knowledge, assimilate it, and apply it to commercial ends (Cohen & Levinthal, 1990: p. 128). Their contribution provided a definition of a construct that continues to evolve today, and is generally accepted as pioneering work. Many studies (e.g., Dyer & Singh, 1998; Lane, Koka, & Pathak, 2006; Van den Bosch, Volberda, & De Boer, 1999; Volberda, Foss, & Lyles, 2010; Zahra & George, 2002) have documented the multidimensional nature of ACAP, but very few (Dyer & Singh, 1998; Lane & Lubatkin, 1998; Lane et al., 2006; Zahra & George, 2002) have revised or expanded on Cohen and Levinthal's definition.

The original definition of ACAP captures a three-stage learning process: recognition, assimilation, and application (Cohen & Levinthal, 1990). However, different alternative approaches to this development process exist (Lane & Lubatkin, 1998; Lane et al., 2006; Szulanski, 1996; Todorova & Durisin, 2007; Van den Bosch et al., 1999; Volberda et al., 2010; Zahra & George, 2002). Today, the definition proposed by Zahra and George (2002) is most widely used, conceptualized, operationalized, and measured. Zahra and George (2002) define ACAP as a set of organizational routines and processes through which firms acquire, assimilate, transform, and exploit knowledge in order to produce a dynamic organizational capability.

Dimensions of ACAP

Based on theoretical backgrounds and empirical studies, researchers view ACAP as a multidimensional construct (Camisón & Forés, 2010; Cohen & Levinthal, 1990; Jiménez-Barrionuevo, García-Morales, & Molina, 2010; Lane & Lubatkin, 1998; Todorova & Durisin, 2007; Zahra & George, 2002) and, thus, various dimensions have been suggested. Based on Cohen and Levinthal's (1990) model, Zahra and George (2002) propose an ACAP construct comprising four dimensions, which they combine into two main subsets: knowledge acquisition and assimilation (PACAP), and knowledge transformation and exploitation (RACAP). Todorova and Durisin (2007) strongly criticize Zahra and George's model, questioning whether assimilation and transformation are two distinct sequential processes. Todorova and Durisin (2007) revisit Cohen and Levinthal's model, and suggest that transformation does not follow assimilation, but rather an alternative process. As a result, they define ACAP as an organization's ability to value, acquire, assimilate or transform, and exploit external knowledge.

Zahra and George's (2002) re-conceptualization of ACAP is most widely used, conceptualized, operationalized, and measured, and also seems most representative of the models present in the literature. Therefore, we re-conceptualize the Zahra and George (2002) model of ACAP that identifies four dimensions (i.e., acquisition, assimilation, transformation, and exploitation) and, simultaneously categorize these into two components: potential absorptive capacity (PACAP) and realized absorptive capacity (RACAP). Acquisition and assimilation (PACAP) initiate a firm's capability to value and acquire external knowledge, but does not guarantee the exploitation of this knowledge. Transformation and exploitation (RACAP) reflect the firm's capability to leverage the knowledge that has been absorbed.

Nearly all researchers examine the multidimensional nature of ACAP as an integrated construct of all four dimensions. These dimensions are also referred as components, stages, phases, processes, or sequences, but present what is essentially a common

Table 1
Stages of organizational learning in firms.

Major stage	Sub-stage
Initiation	Recognition of need or opportunity, knowledge, awareness, evaluation, search, decision or project formulation, and selection
Implementation	Initial implementation, routinization, adjustment, stabilization, and sustained implementation

Source: Damanpour (1996) and Kim (1976)

understanding of the ACAP construct. The four dimensions, or organizational capabilities, of knowledge acquisition, assimilation, transformation, and exploitation represent a firm's ACAP.

Single and dual learning or innovative modes

Research on knowledge and innovation adoption is studied extensively using the concept of stages in the process of adoption (Ali & Park, 2013). The process is not an instantaneous act, but rather occurs over time and consists of a series of actions (Rogers & Shoemaker, 1971). Based on empirical studies and theoretical backgrounds, researchers have proposed models of different stages in the learning process. However, the present study follows Kim (1976, 1980), using a two-stage conceptualization relevant to the key theme of this study. Rogers (1983) and Zaltman et al. (1973) propose a two-stage model consisting of an *initiation stage* and an *implementation stage*, as shown in Table 1. The initiation of learning refers to a process consisting of all activities pertaining to problem perception, information gathering, attitude formation and evaluation, and resource attainment, and leads to a decision to adopt. The implementation of learning is a process consisting of all events and actions that modify both the learning and the organization, including the initial and continued use, until it becomes a routine feature of the organization (Damanpour, 1996). The initiation stage includes sub-stages of knowledge, awareness, evaluation, search, decision, and selection. The implementation stage includes sub-stages of initial implementation, routinization, and stabilization. Based on the two-stage model of Zaltman et al. (1973), Kim (1976, 1980) re-conceptualizes the organizational learning and innovation process model into a *single innovative mode* and a *dual innovative mode*. To study ACAP at the organizational level and different stages of the learning process, it may be assumed that the organization has different sub-units to deal with different stages of the learning process.

The single learning mode

The concept of a single mode refers to an organization that maintains the same structural pattern while learning and innovation take place (Kim, 1976). In such organizations, no clear division of work exists for the two-stage model of the learning process (i.e., the initiation and implementation stages). Employees are wholly involved in the entire learning process. The single mode emphasizes which characteristics of the organizational structure as a whole are compatible with the learning process.

The dual learning mode

The concept of a dual mode refers to an organization with more than two separate organizational units (sub-units) that manage the initiation and implementation stages (Kim, 1976) of knowledge and innovation. For instance, in the manufacturing sector, the research and development (R&D) department is believed to be involved in the initiation stage, while the production department manages the implementation stage of learning. The dual mode emphasizes that the two different stages of the learning process call for different patterns of organizational structure. In this context, PACAP refers to the initiation stage, while RACAP refers to the implementation stage.

Proposed framework

The model proposed in this study (see Table 2) shows how the structural variables relate to ACAP (or PACAP and RACAP) in a single and dual learning mode. The proposed model suggests that in the single mode case, organizations maintain the same structure pattern while ACAP takes place, and have no clear division of work for the various dimensions. However, in the dual mode case, PACAP corresponds to the initiation stage, while RACAP reflects the implementation stage. Furthermore, in the single mode, complexity and integration are high and positive, while formalization and centralization have a low effect on ACAP. The structural variables are initiation-viable, facilitate new knowledge initiation, and propose development. In a dual mode, organizations are involved in ACAP throughout PACAP and RACAP, and are expected to change their structural patterns during the process. Here, high complexity, high integration, low formalization, and low centralization facilitate PACAP, while low complexity, high formalization, high centralization, and high integration facilitate RACAP. The structural variables are initiation-viable and implementation-viable for PACAP and RACAP, respectively.

The following discussion identifies structural variables that are frequently posited as being associated with ACAP. This section also describes how an organizational structure (in terms of complexity, formalization, centralization, and integration) is related to ACAP in a single mode and a dual mode.

Complexity

Structural complexity (or specialization or differentiation) is one of the primary dimensions of organizational design, and refers to the degree of differentiation that exists within an organization (Robbins, 1990). Complexity is likely to improve employees' skills and capabilities in day-to-day activities because they become specialized in those activities (Pertusa-Ortega, Zaragoza-Sáez, & Claver-Cortes, 2010). Complexity describes the extent and intensity of knowledge in the organization (Kim, 1980), as well as the degree to which functions are distinguished with respect to goals, task orientation, time horizon, and degree of autonomy (Hall, 1962, 1977; Lee & Grover, 2000). Complexity can play an important role facilitating the flow of development, because absorbing new knowledge requires a base of prior knowledge (Cohen & Levinthal, 1990).

Pierce and Delbecq (1977) suggest that differentiation (complexity) within the organization is conducive to the *initiation stage*. They propose that it is positively related to innovation (in terms of the *initiation* and *implementation* stages), but that there is a stronger association in the case of initiation than in implementation. Kim (1980) proposes that in single-mode organizations, complexity has a significant and positive influence on innovation, while in dual-mode organizations, complexity has a positive influence on the initiation stage, but a negative influence on implementation. Kim (1976, 1980) concludes that it is more realistic to consider only the single mode, because it is not easy to change the structure of an ongoing organization, and it is also not realistic to expect members of the organization to change their behavior in accordance with a new structural pattern. In contrast, Damanpour (1996) hypothesizes that the influence of complexity on the initiation stage is not significantly different to its influence on the implementation stage, but concludes that complexity influences the initiation stage less positively than it does the implementation stage. The above

Table 2
A contingency framework depicting the relationship between structural variables and ACAP.

Structural variables	Highly ACAP-oriented organization		
	Single mode (Small firms)	Dual mode (Large firms)	
		Initiating unit	Implementation unit
		PACAP	RACAP
Complexity	High	High	Low
Formalization	Low	Low	High
Centralization	Low	Low	High
Pattern	Initiation-viable	Initiation-viable	Implementation-viable
Integration	High	High	High

Source: Kim (1976) and authors own elaboration.

discussion leads to the proposition that the two subsets of ACAP (i.e., PACAP and RACAP) require different organizational structures.

Several studies have analyzed the influence of complexity on structural variables, but the relationship between complexity and ACAP in single and dual modes has yet to be investigated. This study analyzes how complexity influences ACAP, along with other dimensions of organizational design.

Thus, in a dual mode, the complexity of the organization has a positive effect on the PACAP, and a potentially negative effect on RACAP. When a single organizational unit is involved throughout the ACAP process, the positive effect of complexity seems to be greater than the negative effect.

Formalization

The formalization of an organization is a form of control employed by bureaucratic organizations, hierarchical directives, or mechanistic structure, and refers to the degree to which a codified body of formal rules, standard policies, procedures, or behavior prescriptions is developed to govern decisions and work processing (Pierce & Delbecq, 1977; Robbins, 1990). The relevant literature on organization theory supports both a positive impact (Claver-Cortés, Pertusa-Ortega, & Molina-Azorín, 2012; Pertusa-Ortega et al., 2010; Pierce & Delbecq, 1977) and a negative impact (Damanpour, 1991; Kim, 1980; Lee & Choi, 2003) of formalization. One the one hand, those who support the negative impact of formalization on learning argue that strictly following rules and procedures hampers employees from seeking new rules that might lead to an awareness of a performance gap between what the firm is doing and what the employees perceive it should be doing (Kim, 1980; Zaltman et al., 1973). On the other hand, those who support the positive impact of formalization on learning argue that formalization helps to make knowledge more efficient to exploit, easier to apply, and faster to implement (Jansen et al., 2005a). It eliminates the need for communication and coordination among sub-units and creates an organizational memory that helps firms handle routine situations (Van den Bosch et al., 1999).

Several studies have examined the relationship between formalization and the two-stage model of *initiation* and *implementation* (Damanpour & Gopalakrishnan, 1998; Kim, 1980; Pierce & Delbecq, 1977; Zaltman et al., 1973). In other words, they examine learning and innovation in the context of the relationship between formalization and learning. Shepard (1967, p. 474) indicates that low formalization may be considered more appropriate for the *initiation stage*, whereas a higher degree of formalization may be considered more appropriate during the *implementation stage*. During the initiation phase, the organization needs to be flexible and as open as possible to sources of information and alternative courses of action. During the implementation phase, Shepard (1967) indicates that a singleness of purpose is required. These findings suggest that formalization will be negatively related to initiation, but will have a modest positive impact on adoption and implementation (Damanpour & Gopalakrishnan, 1998; Kim, 1980; Pierce & Delbecq, 1977; Shepard, 1967; Zaltman et al., 1973).

Other studies have examined formalization with regard to PACAP and RACAP (De Araújo, 2010; Jansen et al., 2005a, 2006; Jansen, Van Den Bosch, & Volberda, 2005b). Jansen et al. (2005a) argue that formalization is likely to limit the scope of the effort expended on knowledge acquisition, while it also hinders an individual's assimilation of new external knowledge. Formalization creates an organizational memory, which is essential for transformative and exploitative learning. This involves collecting previously applied solutions to specific problems that can help organizations when reacting to prior knowledge or when matching new knowledge to novel applications. On the other hand, formalization may have a negative impact on the exploratory learning process, where excessive rules may hinder the establishment of informal relations with external partners (De Araújo, 2010). Jansen et al. (2005b, 2006) suggest that formalization enhances exploitative learning and innovation by improving current products, services, and processes, and hypothesize that a higher degree of formalization implies (a) a lower level of exploratory innovation, and (b) a higher level of exploitative innovation.

Considering the above, formalization can improve a firm's ability to assimilate and exploit knowledge. In summary, this study adopts the approach that low formalization facilitates PACAP, and higher formalization is more appropriate for RACAP. In the case of a single-mode organization, low formalization seems have a positive association with ACAP.

Centralization

Centralization is determined in terms of (1) the allocation of decision-making in the organization, and (2) the hierarchy of authority within an organization (Aiken & Hage, 1971; Kim, 1980; Pierce & Delbecq, 1977). A highly centralized structure hampers the interaction among the organizational members, reduces opportunities for innovation and knowledge solutions and for creating new knowledge (Damanpour, 1991). Kim (1980) points out that a more centralized decision-making structure implies a greater number of channels through which the communication of new ideas and learning must travel. Although the findings of research on the relationship between centralization and ACAP has been positive in some cases (De Araújo, 2010; Liao, Chuang, & To, 2011; Pierce & Delbecq, 1977), in others, the relationship has been negative (Damanpour, 1991; Kim, 1980; Liao et al., 2011; Zheng, Yang, & McLean, 2010). Even though research has found positive results with regard to the relationship between organizational structure and knowledge (Liao et al., 2011; Tsai, 2002), a decentralized organizational structure (i.e., a high degree of participation in

decision-making) has often been found to have a significant impact on the knowledge management process (Damanpour, 1991; Jansen et al., 2005b; Pierce & Delbecq, 1977; Zheng et al., 2010). Tsai (2002) argues that greater centralization prevents a unit manager from exercising discretion in dealing with the demands of his or her relevant task environment.

Researchers have also examined formalization using the two-stage model comprising an initiation stage and an implementation stage (Damanpour & Gopalakrishnan, 1998; Kim, 1980; Pierce & Delbecq, 1977; Zaltman et al., 1973). Scholars agree that a low level of centralization is appropriate in the initiation stage of the innovation process, because it reduces the amount of information that decision-making units need to have (Kim, 1976). However, a high level of centralization is suggested for the implementation stage because, here, a more specific level of authority and responsibility is required. Jansen et al. (2006) argue that centralization likely reduces PACAP, because PACAP requires non-routine problem solving and deviation from existing knowledge. In contrast, centralization increases the efficiency of information processing and facilitates RACAP. In summary, we take the approach that centralization has a negative influence on the acquisition and assimilation of the new external knowledge underlying PACAP, and a significantly positive influence on the transformation and exploitation of the new external knowledge underlying RACAP.

This implies that in dual-mode organizations, a low level of centralization seems to be appropriate for PACAP, while a high level of centralization is suitable for RACAP. In the case of single-mode organizations, the negative influence of centralization is more appropriate for ACAP.

Integration

Integration is widely recognized as an important structural dimension of an organization (Kim, 1980; Lawrence & Lorsch, 1967; Lee & Grover, 2000; Liao et al., 2011; Miller, 1987). Integration reflects the degree to which the activities of separate actors in the organization can be coordinated through formal coordination mechanisms (Lee & Grover, 2000; Liao et al., 2011) in order to attain the common goals and objectives of the organization (Kim, 1980). Lawrence and Lorsch (1967) suggest that in today's increasingly competitive and dynamic environment, effective organizations have high levels of differentiation and integration. Diversity of occupations, specialization in individual tasks, and horizontal departmentalization according to function are essential to the ACAP process of the organization.

It is also essential to investigate the relationship between integration and the two-stage model, because integration refers to more than just the integration of organizational units involved in the initiation and implementation phases (Kim, 1980). New learning and knowledge is not the outcome of individual effort or that of a single department. Therefore, during the initiation stage, an integrated effort from all relevant departments (e.g., R&D, production, and marketing) is essential. In addition, during the implementation stage, constant coordination among the various sub-departments is needed, and perhaps to a lesser degree, as ideas are adopted and implemented within the existing paradigm of the organization (Kim, 1980). This implies that the process of integration is essential to both PACAP and RACAP, because it enables the organization to collect all previously applied solutions to specific problems, which can help when attempting to react to preceding knowledge or to match new knowledge with novel applications (De Araújo, 2010). For ACAP, the organization needs information from as many sources as possible. In fact, the ACAP process involves the integration of information related to human understanding, equipment (e.g., tools, machinery, building, process technology, technological knowledge, technical skills), and knowledge about marketing, R&D, production, management, finance, human resources, and organizational understanding. For ACAP, an organization requires a differentiated organizational structure with a broad array of formalized managerial positions and specialized tasks, and consequently, liaison personnel to integrate the efforts of the various specialists performing these tasks (Daft & Lengel, 1986; Liao et al., 2011). The above discussion suggests that we can hypothesize that integration is positively related to ACAP in the case of a single mode, and positively related to both PACAP and RACAP in the case of a dual mode.

Table 2 shows a contingency framework that summarizes the relationship between the structural variables and ACAP. Finally, we have the following two propositions:

Proposition 1. *Intermediate propositions that can be applied to single-mode organizations are as follows:*

1) Complexity relates positively to ACAP.
2) Formalization relates negatively to ACAP.
3) Centralization relates negatively to ACAP.
4) Integration relates positively to ACAP.

Proposition 2. *Intermediate propositions that can be applied to dual-mode organizations are as follows:*

1) Complexity relates positively to PACAP, but relates negatively to RACAP.
2) Formalization relates negatively to PACAP, but relates positively to RACAP.
3) Centralization relates negatively to PACAP, but relates positively to RACAP.
4) Integration relates positively to PACAP and RACAP.

Theoretical contributions

Using the theory of organizational design and the theory of knowledge management, this study contributes to the existing literature in different ways. First, it considers organizational structure as an antecedent of ACAP. Second, it relates structural variables to ACAP in single and dual learning modes. Third, this study links the structural variables and ACAP to the two-stage model comprising an initiation stage and an implementation stage. Finally, this study proposes how organizational structure relates to ACAP in a single and dual mode.

In this review of the literature, contingency models on the relationship between organizational structure and ACAP are reviewed for a single- and dual-mode organization. The four structural variables are independently related to ACAP. In a multivariate framework, different combinations of these structural variables will influence the initiation and implementation stages, or PACAP and RACAP, in differing ways. Previous research discusses structure in a deterministic sense, namely the ACAP interaction. Zaltman et al. (1973) suggest that an organization must modify or shift its structure as it moves through the various stages of ACAP. Thus, an organic structure, focusing on decentralized decision-making, organizational adaptability and flexibility, open communications, and a de-emphasis on formal rules and procedures seems more appropriate (Slevin & Covin, 1997) in the initiation stage. Then, a mechanistic structure (centralized decision-making, strict adherence to formally prescribed rules and procedures, tight control of information flow, and carefully constructed reporting and workflow relationships; Slevin & Covin, 1997) is more viable in the implementation stage. However, this conceptualization fails to give proper attention to the role that organizational learning plays in the ACAP process. A more appropriate model would cast exploratory and exploitative learning as a moderating variable or

as an independent variable in the organization–ACAP relationship, depending on the organization type (Pierce & Delbecq, 1977). For example, it is not yet clear how exploratory and exploitative learning moderates the relationship between organization structure and ACAP in single and dual modes.

Organizational structure influences ACAP by shaping patterns and the frequency of communication among organizational members, stipulating locations for decision-making, and following formal explicit rules, regulations, procedures, instructions, and communication in conducting organizational activities related to ACAP in order to prescribe behavior and affect the efficiency and effectiveness of implementing new ideas. Knowledge in organizations can carry over the structural impact onto organizational effectiveness, because the way knowledge is organized, knowledge management activities are coordinated, and the extent to which knowledge management practices are embedded in the daily work processes influence the effectiveness and efficiency of organizational innovation and performance (Zheng et al., 2010).

This also affects ACAP by examining the depth and diversity of the knowledge and expertise that help in the ACAP process. The diverse base of knowledge and expertise in this process increases awareness, the cross-fertilization of ideas, and stimulates innovation and creativity in an organization (Damanpour & Schneider, 2006; Damanpour, 1991, 1996), which reduces costs and favors offering differentiated products and services (Claver-Cortés et al., 2012). Structure may also be helpful for the effective development of ACAP by coordinating and linking the activities of various actors in the organization using formal coordination mechanisms.

Conclusions, limitations, and recommendations

This study concludes that the organizational dimensions needed by ACAP in a single-mode organization are radically different to those needed by a dual-mode organization.

Examining the significant contributions from researchers and practitioners, this study provides a nuanced and in-depth understanding of the multidimensional nature of ACAP in single- and dual-mode organizations under different organizational structures. Based on our review, we propose two sets of propositions. In the single-mode case, organizations maintain the same structural pattern while ACAP takes place, and have no clear division of work for the various ACAP dimensions. In such a scenario, complexity and integration are high and positive, while formalization and centralization have a low effect on ACAP. The structural variables are initiation-viable and facilitate new knowledge initiation and propose development.

In the dual mode case, organizations as a whole are involved in ACAP, throughout PACAP and RACAP, and are expected to change their structural patterns in each stage. In such a scenario, high complexity, high integration, low formalization, and low centralization facilitate PACAP, while low complexity, high formalization, high centralization, and high integration facilitate RACAP. Here, the structural variables are initiation-viable and implementation-viable for PACAP and RACAP, respectively. Overall, this study joins the debate on the various perspectives of ACAP by connecting perspectives and the characteristics of organizational structure, an important variable, in order to better understand this issue.

Several limitations and possible research directions are evident. A limitation of this study is that it focuses on two subsets of ACAP that are considered to be critical, owing to their special interrelation and because they are widely used in existing research. However, a re-conceptualization of ACAP that identifies four dimensions (i.e., acquisition, assimilation, transformation, and exploitation) could be considered. Furthermore, from a conceptual perspective, there is a need for a theoretical ACAP framework linking the environmental factors, contextual variables, individual attributes, human resource component, and multidimensionality of ACAP. Substantive contributions to the understanding of ACAP can be derived from research on the following topics: 1) linking the external environment, internal structure, context, and age of a firm to the multidimensionality of ACAP through longitudinal studies; 2) proposing multiple contingency models to determine the relative importance of the variables in the first topic; 3) testing the propositions developed in this study empirically; and 4) analyzing suitable exploratory and combinatory frameworks. Finally, this study proposes a theoretical framework, but this has not been validated empirically. In this vein, future research should test the model empirically using multivariate and fuzzy-set qualitative comparative analyses (fsQCA; Roig-Tierno, Gonzalez-Cruz, and Llopis-Martinez, 2017) to verify its validity and determine its impact on organizational management and performance.

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